ACC.13
62nd Annual Scientific Session & Expo
TCT@ACC-i2
innovation in intervention

E1472
JACC March 12, 2013
Volume 61, Issue 10

Prevention

ASSOCIATION OF ECG R WAVE TO RADIAL PULSE DELAY WITH SUBCLINICAL CARDIOVASCULAR DISEASE AND RISK FACTORS: THE MULTI-ETHNIC STUDY OF ATHEROSCLEROSIS (MESA)

Poster Contributions
Poster Sessions, Expo North
Monday, March 11, 2013, 9:45 a.m.-10:30 a.m.

Session Title: Preclinical Manifestations of Hypertension and Arterial Stiffness
Abstract Category: 25. Prevention: Hypertension
Presentation Number: 1276-23

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Background: ECG R-wave to Radial Artery Pulse Delay (RRD) is a novel hemodynamic index obtainable from a single tonometric measurement with simultaneous ECG to assess the timing of an electrical marker (ECG R-wave peak) until a corresponding mechanical feature (end diastole at the radial pulse). We studied the cross-sectional association between RRD, prevalence of metabolic syndrome and coronary artery calcium score (CAC) in the MESA study. RRD comprises electromechanical delay, isovolumic contraction time and pulse transit time between the aorta and the radial artery (a time determined by the average arterial pulse wave velocity).

Methods: Radial artery tonometry was performed for 30 seconds in 3929 participants: female 53%; 40% white, 27% African-American, 21% Hispanics and 12% Chinese. RRD was calculated as the median across beats of the delay from the peak R-wave until the start of the systolic upstroke of the radial artery pulse waveform. The analytic variable was the residual of RRD (msec) in linear regression, given transit path length (cm). Linear regression, adjusted for age, race, sex, height, and transit path length, estimated mean blood pressure (BP), presence of the metabolic syndrome, and CAC Agatston score across RRD.

Results: Women had higher RRD. Age, BP, metabolic syndrome prevalence, and geometric mean CAC score were all lower with greater RRD (Table).

Conclusion: RRD associated with cardiovascular risk factors and CAC. RRD is simple to apply and may be useful in cardiovascular studies.

Means across sextiles of ECG R Wave to Radial Pulse Delay (RRD)

Characteristics	1	2	3	4	5	6	P-trend
N	654	655	655	655	655	655	
RRD (msec) range	70.0 - 107.4	107.5 - 115.1	115.2 - 121.6	121.7 - 128.5	128.6 - 137.2	137.3 - 231.1	
Women (%)	48.4	51.1	53.3	55.1	56.1	55.8	<0.001
Age (years)	71.2	70.5	69.9	69.6	68.4	68.9	<0.001
Systolic BP (mmHg)	130.7	126.8	125.7	124.0	119.8	119.1	<0.001
Diastolic BP (mmHg)	69.8	69.8	69.2	68.3	66.7	66.4	<0.001
Metabolic Syndrome (%)	30.8	30.2	25.4	27.2	25.2	23.0	0.01
CAC score (geometric mean)	40.1	27.4	28.2	26.2	20.3	21.5	<0.001